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Brief Bio

I hold a PhD in Nuclear Physics from Aarhus University, Denmark. For more than a decade I was a frequent visitor at particle accelerator laboratories such as CERN in Switzerland, studying the smallest building blocks of matter. Nowadays, however, my focus has shifted to a more applied realm. As the Lead Data Scientist at Open Ocean Robotics, I help making sense of a wide range of ocean sensor data collected by unmanned surface vessels, building data analysis pipelines, for example, automating the detection and classification of marine mammal vocalisations.

Employment

2022 – Present	Lead Data Scientist, Open Ocean Robotics
2019 – Present	Adjunct Prof., Computer Science, Dalhousie University
2020 – 2022	Senior Staff Scientist, Dalhousie University
2018 – 2020	Lead Acoustic Data Analyst, Dalhousie University
2015 – 2018	Assistant Prof., Dept. of Physics and Astronomy, Aarhus University
2013 – 2015	Postdoc, Dept. of Physics and Astronomy, Aarhus University
2010 – 2013	Postdoc, TRIUMF, University of British Columbia

University Education

2006 – 2010	PhD Physics, Aarhus University
2005 – 2006	Fulbright student, University of Washington
2002 – 2005	BSc Physics and Mathemathics, Aarhus University

Research Grants

2022 – 2026	Canada Nature Fund for Aquatic Species at Risk, *Building an 'intelligent' whale detection and movement forecast system.*, €1.0M (Co-P.I.)
2020 – 2022	Ocean and Freshwater Science Contribution Program, *Building Neural Networks for Classification of Killer Whale Calls*, €0.40M (Co-P.I.)
2015 – 2018	The Villum Foundation Young Investigator Programme, *Nuclear Astrophysics at the Precision Frontier*, €0.41M (P.I.)

Fellowships, Scholarships, and Awards

2020	Mitacs Accelerate Fellowship, *Identification of High-Frequency Periodic Acoustic Fish Tags With Deep learning*, €32k
2020	Ocean Frontier Institute Visiting Fellowship, €4k

2019 NVIDIA Accelerated Data Science GPU Grant, €2k

2010 The Villum Foundation Postdoc Fellowship, *Experiments in Nuclear Astrophysics With Radioactive Beams at the ISAC-II Facility at TRIUMF*, $190k

2007 Foreign Graduate Student Invitation Program Grant, Tokyo Institute of Technology, Japan

2005 The Danish-American Fulbright Commission; Nordea Danmark-fonden; Faculty of Science, Aarhus University; Etatsråd CG Filtenborg og Hustru Marie Filtenborgs Studielegat; Observator mag.scient Julie Marie Vinter Hansens Rejselegat, €18k (combined)

2002 International Physics Olympiad Honorable Mention

Publications

Over 60 peer-reviewed research articles and conference proceedings plus a smaller number of feature articles and viewpoints; 1,047 citations and *h*-index of 18. (Google Scholar, 2022.02.05.) A selection of recent or noteworthy papers is provided below. For a complete list, see page 4 or go to oliskir.github.io.

2023 B. Padovese, *et al.*, *Adapting deep learning models to new acoustic environments—A case study on the North Atlantic right whale upcall*, Ecological Informatics **77**, 102169.

2021 S. Medisetty, *et al.*, *Identification of periodic fish tags with deep learning*, The Journal of Ocean Technology **16**, 134–149.

2021 M. J. Rider, *et al.*, *Space use patterns of sharks in relation to boat activity in an urbanized coastal waterway*, Marine Environmental Research **172**, 105489.

2020 O. S. Kirsebom, *et al.*, *Performance of a deep neural network at detecting North Atlantic right whale upcalls*, The Journal of the Acoustical Society of America **147**, 2636–2646.

2019 O. S. Kirsebom, *et al.*, *Discovery of an Exceptionally Strong β-Decay Transition of ^{20}F and Implications for the Fate of Intermediate-Mass Stars*, Physical Review Letters **123**, 262701.

2018 O. S. Kirsebom, *et al.*, *First Accurate Normalization of the β-delayed α Decay of ^{16}N and Implications for the $^{12}C(\alpha,\gamma)^{16}O$ Astrophysical Reaction Rate*, Physical Review Letters **121**, 142701.

2012 O. S. Kirsebom, *et al.*, *Improved Limit on Direct α Decay of the Hoyle State*, Physical Review Letters **108**, 202501.

Talks

Numerous (> 50) presentations at international conferences and workshops including several invited talks. For a complete list, see oliskir.github.io.

Software

2020 kadlu, Underwater sound propagation modelling, Python

2019 ketos, Deep learning audio analysis, Python

2018 simX, Nuclear physics monte carlo simulation, C++

2018 Open R-matrix, Nuclear physics modelling, C++

Teaching

2013 – 2017	Extracurricular programme for 1st-year students, Coordinator
2015	Nuclear astrophysics graduate course, Lecturer
2014	Electromagnetism laboratory course, Coordinator
2006 – 2010	Physics and mathematics undergraduate courses, Teaching Assistant

Student Supervision

2020 – 2021	Santosh Medisetty, MSc Computer Science, Dalhousie University (Co-supervisor)
2019 – 2020	Xuhui Liu, MSc Computer Science, Dalhousie University (Co-supervisor)
2016 – 2017	Helle Bisgaard Sørensen, MSc Physics, Aarhus University (Principal supervisor)
2014 – 2015	Sofie Tilbæk Nielsen, BSc Physics, Aarhus University (Principal supervisor)

Conference and Workshop Organization

21–22 Nov 2019	Organizer of the workshop *Detection and Classification in Marine Bioacoustics with Deep Learning* with 30 participants from Canada, the U.S. and Europe.

Academic Services

2022 – Present	Member of ONC's Ocean Observatory Council
2016 – 2018	Member of the Liaison Committee at the Department of Physics and Astronomy, Aarhus University

Refereeing

Physics Review Letters, Physical Review C, The Astrophysical Journal, Journal of the Acoustical Society of America, Hyperfine Interactions, Methods in Ecology and Evolution, PLOS One

Professional Memberships

2018 – 2020	Member of the Canadian Acoustical Association
2013 – 2018	Member of the Danish Physical Society

Languages

Danish (mother tongue), English (fluent), German (intermediate), Italian (intermediate)

Publications

Research Articles

B. Padovese, O. S. Kirsebom, F. Frazao, C. H. Evers, W. A. Beslin, J. Theriault, and S. Matwin. *Adapting deep learning models to new acoustic environments - A case study on the North Atlantic right whale upcall.* Ecological Informatics **77**, 102169. ISSN 1574-9541 (2023), URL http://dx.doi.org/https://doi.org/10.1016/j.ecoinf.2023.102169

L. Sun, C. Fry, B. Davids, N. Esker, C. Wrede, M. Alcorta, S. Bhattacharjee, M. Bowry, B. A. Brown, T. Budner, R. Caballero-Folch, L. Evitts, M. Friedman, A. Garnsworthy, B. Glassman, G. Hackman, J. Henderson, O. S. Kirsebom, J. Lighthall, P. Machule, J. Measures, M. Moukaddam, J. Park, C. Pearson, D. Prez-Loureiro, C. Ruiz, P. Ruotsalainen, J. Smallcombe, J. K. Smith, D. Southall, J. Surbrook, L. E. Weghorn, and M. Williams. *First application of Markov chain Monte Carlo-based Bayesian data analysis to the Doppler-shift attenuation method.* Physics Letters B **839**, 137801. ISSN 0370-2693 (2023), URL http://dx.doi.org/https://doi.org/10.1016/j.physletb.2023.137801

M. Kuhlwein, K. Lytje, H. O. U. Fynbo, A. Gad, E. Jensen, O. S. Kirsebom, M. Munch, J. Refsgaard, and K. Riisager. *Exclusive decay study of the 16.62 MeV* $(2^-, T = 1)$ *resonance in* ^{12}C. Physics Letters B **825**, 136857. ISSN 0370-2693 (2022), URL http://dx.doi.org/https://doi.org/10.1016/j.physletb.2021.136857

S. Medisetty, D. Ouellette, F. Smith, M. Richard, S. Johnston, J. Quirion, J. Newport, C. Whidden, and O. Kirsebom. *Identification of periodic fish tags with deep learning.* The Journal of Ocean Technology **16**, 134–149 (2021)

M. J. Rider, O. S. Kirsebom, A. J. Gallagher, E. Staaterman, J. S. Ault, C. R. Sasso, T. Jackson, J. A. Browder, and N. Hammerschlag. *Space use patterns of sharks in relation to boat activity in an urbanized coastal waterway.* Marine Environmental Research page 105489. ISSN 0141-1136 (2021), URL http://dx.doi.org/https://doi.org/10.1016/j.marenvres.2021.105489

N. J. Hubbard, C. A. Diget, S. P. Fox, H. O. U. Fynbo, A. M. Howard, O. S. Kirsebom, A. M. Laird, M. Munch, A. Parikh, M. Pignatari, and J. R. Tomlinson. *New Experimental 23Na(, p)26Mg Reaction Rate for Massive Star and Type Ia Supernova Models.* The Astrophysical Journal **912**, 59 (2021), URL http://dx.doi.org/10.3847/1538-4357/abee91

B. Padovese, F. Frazao, O. S. Kirsebom, and S. Matwin. *Data augmentation for the classification of North Atlantic right whales upcalls.* The Journal of the Acoustical Society of America **149**, 2520–2530 (2021), URL http://dx.doi.org/10.1121/10.0004258

O. S. Kirsebom, A. M. Howard, M. Munch, S. Sablok, J. A. Swartz, and H. O. U. Fynbo. *Experimental study of the* $^{11}B(p, 3\alpha)\gamma$ *reaction at* $E_p = 0.5$*–2.7 MeV.* The European Physical Journal A **56**, 179 (2020), URL http://dx.doi.org/10.1140/epja/s10050-020-00183-z

O. S. Kirsebom, F. Frazao, Y. Simard, N. Roy, S. Matwin, and S. Giard. *Performance of a deep neural network at detecting North Atlantic right whale upcalls.* The Journal of the Acoustical Society of America **147**, 2636–2646 (2020), URL http://dx.doi.org/10.1121/10.0001132

M. Munch, O. S. Kirsebom, J. A. Swartz, and H. O. U. Fynbo. *Resolving the* $^{11}B(p, \alpha_0)$ *cross-section discrepancies between 0.5 and 3.5 MeV.* The European Physical Journal A **56**, 17 (2020), URL http://dx.doi.org/10.1140/epja/s10050-019-00016-8

O. S. Kirsebom, S. Jones, D. F. Strömberg, G. Martínez-Pinedo, K. Langanke, F. K. Röpke, B. A. Brown, T. Eronen, H. O. U. Fynbo, M. Hukkanen, A. Idini, A. Jokinen, A. Kankainen, J. Kostensalo, I. Moore, H. Möller, S. T. Ohlmann, H. Penttilä, K. Riisager, S. Rinta-Antila, P. C. Srivastava, J. Suhonen, W. H. Trzaska, and J. Äystö. *Discovery of an Exceptionally Strong β-Decay Transition of ^{20}F and Implications for the Fate of Intermediate-Mass Stars.* Phys. Rev. Lett. **123**, 262701 (2019), URL http://dx.doi.org/10.1103/PhysRevLett.123.262701

O. S. Kirsebom, M. Hukkanen, A. Kankainen, W. H. Trzaska, D. F. Strömberg, G. Martínez-Pinedo, K. Andersen, E. Bodewits, B. A. Brown, L. Canete, J. Cederkäll, T. Enqvist, T. Eronen, H. O. U. Fynbo, S. Geldhof, R. de Groote, D. G. Jenkins, A. Jokinen, P. Joshi, A. Khanam, J. Kostensalo, P. Kuusiniemi, K. Langanke, I. Moore, M. Munch, D. A. Nesterenko, J. D. Ovejas, H. Penttilä, I. Pohjalainen, M. Reponen, S. Rinta-Antila, K. Riisager, A. de Roubin, P. Schotanus, P. C. Srivastava, J. Suhonen, J. A. Swartz, O. Tengblad, M. Vilen, S. Vínals, and J. Äystö. *Measurement of the $2^+ \rightarrow 0^+$ ground-state transition in the β decay of ^{20}F.* Phys. Rev. C **100**, 065805 (2019), URL http://dx.doi.org/10.1103/PhysRevC.100.065805

B. Davids, M. Williams, N. E. Esker, M. Alcorta, D. Connolly, B. R. Fulton, K. Hudson, N. Khan, O. S. Kirsebom, J. Lighthall, and P. Machule. *Initial operation of the recoil mass spectrometer EMMA at the ISAC-II facility of TRIUMF.* Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment **930**, 191–195 (2019), URL http://dx.doi.org/https://doi.org/10.1016/j.nima.2019.03.070

O. S. Kirsebom, O. Tengblad, R. Lica, M. Munch, K. Riisager, H. O. U. Fynbo, M. J. G. Borge, M. Madurga, I. Marroquin, A. N. Andreyev, T. A. Berry, E. R. Christensen, P. D. Fernández, D. T. Doherty, P. Van Duppen, L. M. Fraile, M. C. Gallardo, P. T. Greenlees, L. J. Harkness-Brennan, N. Hubbard, M. Huyse, J. H. Jensen, H. Johansson, B. Jonson, D. S. Judson, J. Konki, I. Lazarus, M. V. Lund, N. Marginean, R. Marginean, A. Perea, C. Mihai, A. Negret, R. D. Page, V. Pucknell, P. Rahkila, O. Sorlin, C. Sotty, J. A. Swartz, H. B. Sørensen, H. Törnqvist, V. Vedia, N. Warr, and H. De Witte. *First Accurate Normalization of the β-delayed α Decay of ^{16}N and Implications for the $^{12}C(\alpha,\gamma)^{16}O$ Astrophysical Reaction Rate.* Physical Review Letters **121**, 142701 (2018), URL http://dx.doi.org/10.1103/PhysRevLett.121.142701

M. Dahl, A. Brun, O. S. Kirsebom, and G. Andresen. *Improving Short-Term Heat Load Forecasts with Calendar and Holiday Data.* Energies **11**, 1678 (2018), URL http://dx.doi.org/10.3390/en11071678

M. Munch, O. S. Kirsebom, J. A. Swartz, K. Riisager, and H. O. U. Fynbo. *Measurement of the full excitation spectrum of the $^7Li(p,\gamma)\alpha\alpha$ reaction at 441 keV.* Physics Letters B **782**, 779–784 (2018), URL http://dx.doi.org/10.1016/j.physletb.2018.06.013

J. Refsgaard, H. O. U. Fynbo, O. S. Kirsebom, and K. Riisager. *Three-body effects in the Hoyle-state decay.* Physics Letters B **779**, 414–419 (2018), URL http://dx.doi.org/10.1016/j.physletb.2018.02.031

V. Pesudo, M. J. G. Borge, A. M. Moro, J. A. Lay, E. Nácher, J. Gómez-Camacho, O. Tengblad, L. Acosta, M. Alcorta, M. A. G. Alvarez, C. Andreoiu, P. C. Bender, R. Braid, M. Cubero, A. D. Pietro, J. P. Fernández-García, P. Figuera, M. Fisichella, B. R. Fulton, A. B. Garnsworthy, G. Hackman, U. Hager, O. S. Kirsebom, K. Kuhn, M. Lattuada, G. Marquínez-Durán, I. Martel, D. Miller, M. Moukaddam, P. D. O'Malley, A. Perea, M. M. Rajabali, A. M. Sánchez-Benítez, F. Sarazin, V. Scuderi, C. E. Svensson, C. Unsworth, and Z. M. Wang. *Scattering of the Halo Nucleus ^{11}Be on ^{197}Au at Energies around the Coulomb Barrier.* Phys-

ical Review Letters **118**, 152502 (2017), URL http://dx.doi.org/10.1103/physrevlett.118.152502

M. V. Lund, A. Andreyev, M. J. G. Borge, J. Cederkll, H. D. Witte, L. M. Fraile, H. O. U. Fynbo, P. T. Greenlees, L. J. Harkness-Brennan, A. M. Howard, M. Huyse, B. Jonson, D. S. Judson, O. S. Kirsebom, J. Konki, J. Kurcewicz, I. Lazarus, R. Lica, S. Lindberg, M. Madurga, N. Marginean, R. Marginean, I. Marroquin, C. Mihai, M. Munch, E. Nacher, A. Negret, T. Nilsson, R. D. Page, S. Pascu, A. Perea, V. Pucknell, P. Rahkila, E. Rapisarda, K. Riisager, F. Rotaru, C. Sotty, M. Stanoiu, O. Tengblad, A. Turturica, P. V. Duppen, V. Vedia, R. Wadsworth, and N. Warr. *Beta-delayed proton emission from ^{20}Mg.* The European Physical Journal A **52**, 304 (2016), URL http://dx.doi.org/10.1140/epja/i2016-16304-x

K. L. Laursen, H. O. U. Fynbo, O. S. Kirsebom, K. S. Madsbøll, and K. Riisager. *Complete kinematical study of the 3α breakup of the 16.11 MeV state in ^{12}C.* The European Physical Journal A **52**, 271 (2016), URL http://dx.doi.org/10.1140/epja/i2016-16271-2

M. Munch, M. Alcorta, H. O. U. Fynbo, M. Albers, S. Almaraz-Calderon, M. L. Avila, A. D. Ayangeakaa, B. B. Back, P. F. Bertone, P. F. F. Carnelli, M. P. Carpenter, C. J. Chiara, J. A. Clark, B. DiGiovine, J. P. Greene, J. L. Harker, C. R. Hoffman, N. J. Hubbard, C. L. Jiang, O. S. Kirsebom, T. Lauritsen, K. L. Laursen, S. T. Marley, C. Nair, O. Nusair, D. Santiago-Gonzalez, J. Sethi, D. Seweryniak, R. Talwar, C. Ugalde, and S. Zhu. *Independent measurement of the Hoyle state β feeding from ^{12}B using Gammasphere.* Physical Review C **93**, 065803 (2016), URL http://dx.doi.org/10.1103/physrevc.93.065803

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J. Refsgaard, O. Kirsebom, E. Dijck, H. Fynbo, M. Lund, M. Portela, R. Raabe, G. Randisi, F. Renzi, S. Sambi, A. Sytema, L. Willmann, and H. Wilschut. *Measurement of the branching ratio for β-delayed α decay of ^{16}N.* Physics Letters B **752**, 296–301 (2016), URL http://dx.doi.org/10.1016/j.physletb.2015.11.047

K. L. Laursen, H. O. U. Fynbo, O. S. Kirsebom, K. S. Madsbøll, and K. Riisager. *Unbound states in ^{12}C populated by γ-decay of the $(J^\pi, T) = (2^+, 1)$ 16.11 MeV state.* The European Physical Journal A **52**, 370 (2016), URL http://dx.doi.org/10.1140/epja/i2016-16370-0

V. Margerin, G. Lotay, P. J. Woods, M. Aliotta, G. Christian, B. Davids, T. Davinson, D. T. Doherty, J. Fallis, D. Howell, O. S. Kirsebom, D. J. Mountford, A. Rojas, C. Ruiz, and J. A. Tostevin. *Inverse Kinematic Study of the $^{26g}Al(d,p)Al^{27}$ Reaction and Implications for Destruction of ^{26}Al in Wolf-Rayet and Asymptotic Giant Branch Stars.* Physical Review Letters **115**, 062701 (2015), URL http://dx.doi.org/10.1103/physrevlett.115.062701

A. M. Howard, M. Munch, H. O. U. Fynbo, O. S. Kirsebom, K. L. Laursen, C. A. Diget, and N. J. Hubbard. *$^{23}Na(\alpha,p)^{26}Mg$ Reaction Rate at Astrophysically Relevant Energies.* Physical Review Letters **115**, 052701 (2015), URL http://dx.doi.org/10.1103/physrevlett.115.052701

O. S. Kirsebom, H. O. U. Fynbo, K. Riisager, R. Raabe, and T. Roger. *Analysis of the response of silicon detectors to α particles and ^{16}O ions.* Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment **758**, 57–61 (2014), URL http://dx.doi.org/10.1016/j.nima.2014.05.005

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M. J. G. Borge, L. M. Fraile, H. O. U. Fynbo, B. Jonson, O. S. Kirsebom, T. Nilsson, G. Nyman, G. Possnert, K. Riisager, and O. Tengblad. *Rare βp decays in light nuclei.* Journal of Physics G: Nuclear and Particle Physics **40**, 035109 (2013), URL http://dx.doi.org/10.1088/0954-3899/40/3/035109

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O. S. Kirsebom and B. Davids. *One fewer solution to the cosmological lithium problem.* Physical Review C **84**, 058801 (2011), URL http://dx.doi.org/10.1103/physrevc.84.058801

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